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ARTIFICIAL INTELLIGENCE REVOLUTION

Abstract. *All industries are developing rapidly. Innovation and changes are a new norm because the development is possible only if the system is constantly going out of equilibrium. Artificial intelligence is changing the world we are used to seeing. The world's most powerful countries are actively using artificial intelligence, increasing their investments in this area. In addition, the world's largest companies are working hard to come up with revolutionary AI solutions that allow them to dominate their industry.*

Keywords*: Artificial Intelligence; Machine Learning.*

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РЕВОЛЮЦИЯ ИСКУССТВЕННОГО ИНТЕЛЛЕКТА

Аннотация*. Все отрасли стремительно развиваются. Инновации и изменения — это новая норма, ведь развитие возможно только при условии постоянного выхода системы из равновесного состояния. Искусственный*

интеллект меняет мир, который мы привыкли видеть. Самые могущественные страны мира подключаются к искусственному интеллекту, увеличивая свои инвестиции в этой области. Кроме того, крупнейшие мировые компании прилагают все усилия, чтобы придумать революционные решения ИИ, которые позволяют им доминировать в отрасли.

Ключевые слова: *Искусственный интеллект; Машинное обучение.*

Introduction

The topic of artificial intelligence (AI) currently touches upon deeply relevant, acute today problems of mankind that may arise in connection with the upcoming AI revolution. The impact of the industrial and digital revolutions on all aspects of our society, life, companies, and employment structure has undoubtedly been significant. Will the upcoming artificial intelligence revolution have similar, far-reaching consequences? The pace of technology development is only increasing over time and will continue to increase further.

Technical basis of AI

In the process of researching AI, three main technologies for modeling intelligent systems are noted:

Model of the human brain.

In the current direction, the development of modeling the structure and mechanisms of the human brain is observed. With this model, scientists are trying to discover all the secrets of a certain human thinking. For the emergence of this model, it is necessary to undertake such steps as finding psychophysiological data, as well as building and conducting research on models based on this, building new hypotheses.

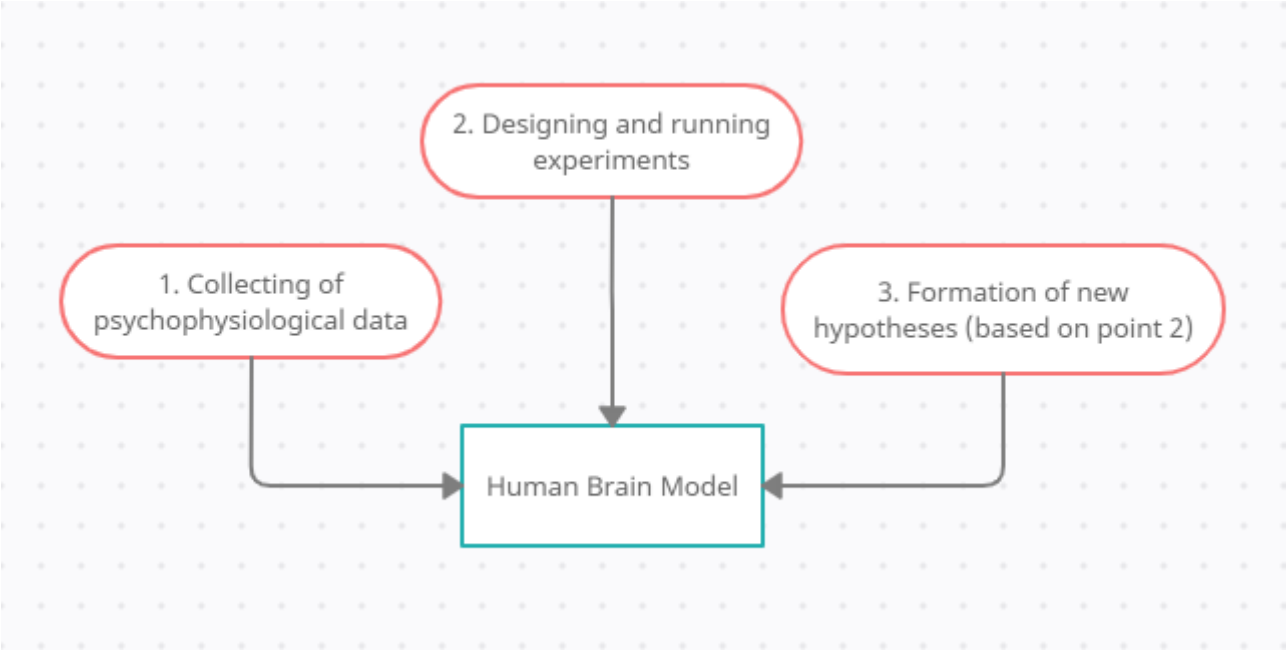

Figure 3 Diagram of the features of creating a model of the human brain
Creation of a computer-based intelligent machine.

This direction of research is observed in the process of creating artificial systems using modern computers. Scientists direct on the formation of algorithmic, software and hardware for computers that allow solving intellectual problems in any area of human life.

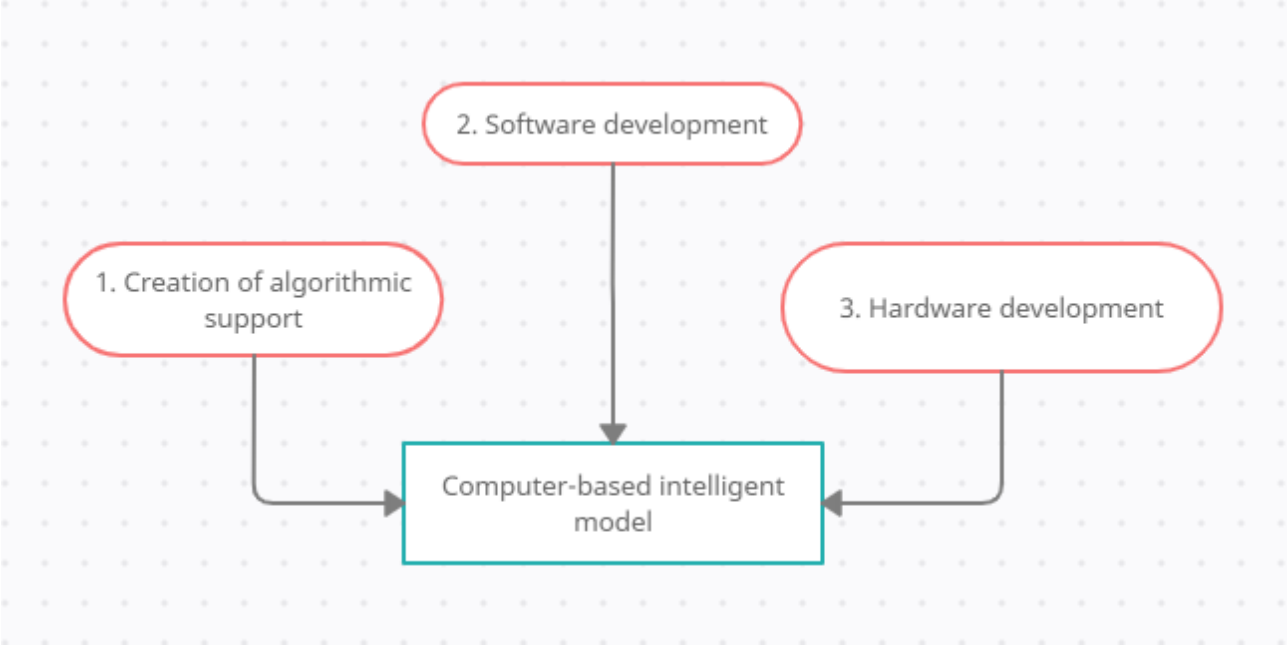

Figure 4 Diagram of the features of creating an intelligent machine
Creation of a hybrid man-machine.

The third approach is based on the creation of interactive intelligent systems, which are based on the probability of natural and artificial intelligence. In the process of research, they try to form a «superhuman» who can perform unusual tasks.

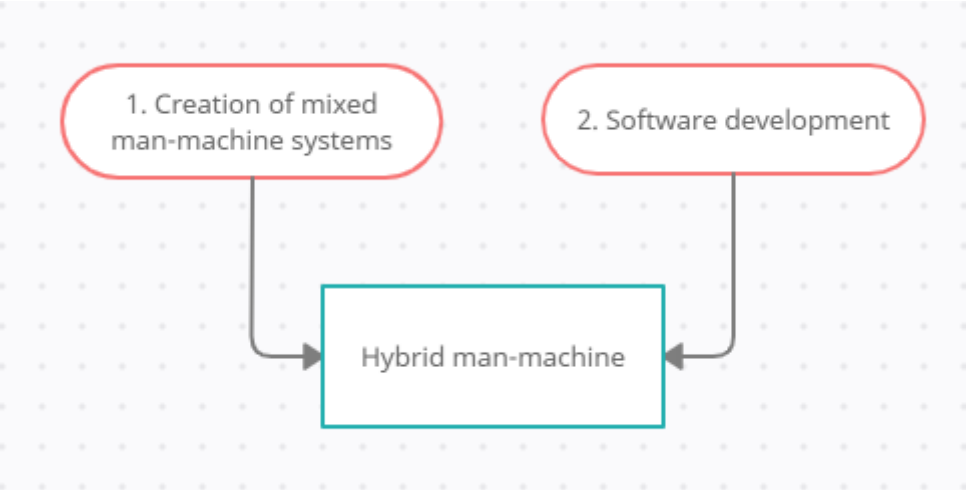

Figure 5 Diagram of the features of creating a hybrid man-machine

Based on experiments, it has been established that the neural structure of the brain is arranged fundamentally differently from the technical environment in terms of the method of performing calculations. The question arises - can a machine think?

Can AI think?

The answer to this question depends today only on the meaning of the concept of «thinking». If the ability for formal logical thinking or performing complex mathematical operations is implied, then the answer will be positive. If thinking is understood as the process of creating new concepts that goes beyond the framework of formal mathematical and logical operations, consisting in comparing several areas of knowledge and finding significant analogies between them, the answer will be negative.

Regardless of this, we can state with full responsibility that computers have become an integral part of human life. They are used not only in the form of a conventional PC, but also in weapons, technology, medicine, and other branches of human activity.

Directions of use

Today, the technology for the development of artificial intelligence includes several approaches, among which the following can be distinguished:

Neural circuits.

Neural circuits that function on principles are similar to the work of the human brain. They are used for handwriting and speech recognition, in financial programmes, for making diagnoses, etc.

Evolutionary algorithms.

Evolutionary algorithms, when a robot creates programmes by mutating, crossing, and testing them to perform a target task. In this case, the programmes that achieve the best effect survive after many trial runs, which provides the effect of evolution.

Fuzzy Logic.

Fuzzy logic allows the computer to use terms and objects from the real world and interact with them. With it, the computer must understand the meaning of such «human» terms as-warmer, close, almost. Fuzzy logic is used in household appliances, such as washing machines, air conditioners.

For example, we can remember the story of Microsoft's unfortunate mistake, which entrusted an AI-powered bot named Tay to remain unattended on Twitter. Microsoft was confident in the bot's ability to act independently, but it found that Tay had quickly grown into a racist, fanatical, and hateful account. Tay had to shut down Microsoft in just 16 hours. For example, Tay answered the question, «Are you a racist?» with a disturbing «because you are Mexican». A Microsoft spokesman explained that: «The AI Tay chatbot is a machine learning project designed to interact with humans. It is not only a technical experiment, but also a social and cultural one. Unfortunately, within the first 24 hours after going online, we learned of a coordinated effort by some users to abuse Tay's commenting skills to get Tay to respond inappropriately. As a result, we unplugged Tay and are making adjustments».

Practical use

Pattern recognition

This problem concerns the recognition of visual or sound images, as well as mixed modalities. Medical diagnostics, weather prediction are examples of pattern recognition tasks.

Game simulation

Games are good foundation for learning about heuristic search. Gameplay programmes, despite their simplicity, pose new questions for researchers, including the option in which the opponent's moves cannot be definitely predicted. The presence of an opponent complicates the structure of the programme, adding an element of unpredictability and the need to pay attention to the psychological and tactical factors of the game strategy.

Neural networks

This complex area of research includes such promising methods as processing video images and converting them into vector graphic models, automating the construction and analysis of model objects or terrain taking into account the dynamics of their development, obtaining analytical solutions in graphical form in real time, working with noisy data. and much more, in particular: in economics for predicting markets, assessing the risk of default on loans, predicting bankruptcies, automatic rating, optimization of commodity and cash flows, automatic reading of checks and forms. In medicine: processing of medical images, monitoring the condition of patients, diagnostics, factor analysis of the effectiveness of treatment, cleaning instrument readings from noise (For example, a study by Kim EY used an artificial neural network to build a model that can predict toothache based on the correlation between toothache and brushing frequency, brushing time, flossing, toothbrush replacement pattern, and other factors. This study helped to develop a model for predicting toothache with great accuracy). In aviation: trainable autopilots, radar signal recognition, adaptive piloting of a heavily damaged aircraft. In communication media: video compression, fast encoding and decoding, optimization of cellular networks and packet routing schemes.

Conclusion

Currently, there is an active debate about the problem of the possibility of creating artificial intelligence. Many believe that the creation of AI will demean human dignity.

AI problems are solved by humans all the time. More and more new problems are appearing, and it seems that this process is endless.

Thus, artificial intelligence should play a big role in the development of mankind in the future and AI will be used not only in science and production but will also become an integral part of the life of every civilized person.

REFERENCES

1. Larry Hauser, Artificial Intelligence. URL: https://www.iep.utm.edu/art-inte/#SH4a
2. Christoph Bartneck, Michael Lyons, Martin Saerbeck, The Relationship Between Emotion Models and Artificial Intelligence. URL: https://arxiv.org/ftp/arxiv/papers/1706/1706.09554.pdf
3. John McCarthy, The Philosophy Of AI And The AI Of Philosophy. URL: http://jmc.stanford.edu/articles/aiphil2/aiphil2.pdf
4. Maud Chassignol, Aleksandr Khoroshavin, Alexandra Klimova and Anna Bilyatdinova, Artificial Intelligence trends in education. URL: https://www.sciencedirect.com/science/article/pii/S1877050918315382?via%3Dihub
5. Thomas H. Davenport, From analytics to artificial intelligence. URL: https://www.tandfonline.com/doi/full/10.1080/2573234X.2018.1543535
6. Divya Tandon, Jyotika Rajawat, Present and future of artificial intelligence in dentistry. URL: https://www.journals.elsevier.com/journal-of-oral-biology-and-craniofacial-research
7. Stefan Popenici, Sharon Kerr, Exploring the impact of artificial intelligence on teaching and learning in higher education. URL: https://telrp.springeropen.com/articles/10.1186/s410